

## 2008 PROPOSED REVISED MASTER'S DEGREE REQUIREMENTS

### DEPARTMENT OF MICROBIOLOGY AND IMMUNOLOGY

**Preamble:** In light of the initiation of the Indiana Biomedical Gateway (IBMG) program, the Department of Microbiology and Immunology at Indiana University School of Medicine has undergone a review of its requirements for the Master's Degree and proposes the changes outlined below. The goal of the curriculum is to produce graduates who could perform at the level expected of a PA within IUPUI or at the level of an Associate in industry, for example Eli Lilly and Company. In addition, we wanted a flexible curriculum designed to meet the needs of the individual student and to emphasize a research experience. It should be pointed out that the M.S. curriculum, like the approved Ph.D. curriculum, is based on the three focus areas within the Department of Microbiology and Immunology: cancer, immunology, and pathogenesis. As will be described below, our proposed curriculum is consistent with the current one but has evolved to incorporate the coursework provided by the IBMG. It is also consistent with a decrease in didactic coursework required for our Ph.D. program.

**The essence of the proposed graduate program:** There are two parts to the program: didactic coursework and a research thesis. The student will take didactic courses that provide a general understanding of concepts shared by all biological disciplines as well as discipline-specific courses. Further, the student will attend courses covering the conduct and communication of research. After two rotations, the student will choose a mentor and undertake an original research project. The student will engage in ongoing accrual of knowledge and accomplishments in Microbiology and Immunology through attendance at the weekly departmental seminar and participation in the weekly departmental Research in Progress (RIP) meeting.

**Details of the proposed requirements for this graduate program:** Appended to this document is the list of proposed course requirements. In addition to 2 rotations [J802 Introduction to Research (2 cr)], each student will take at least 12 credits of course-work, including at least 5 credits chosen from G715 Biomed I – Biomedical Science I – Biochemical Basis of Biological Processes (3cr), G716 Biomed II – Biomedical Science II – Molecular Biology and Genetics (3 cr), and G717 Biomed III – Biomedical Science III – Cellular Basis of Systems Biology (3 cr) or G817 Molecular Basis of Cell Structure and Function (2 cr); 1 credit of G655 Skills - Research Communications Seminar, 1 credit of G855 Skills – Experimental Design and Biostatistics, and 1 credit of G505 Responsible Conduct of Research (1 cr); and least 4 credits chosen from courses within the focus areas of Microbiology and Immunology, i.e., immunology, pathogenesis, cancer [G729 Introduction to Immunological Systems (1 cr), G728 Fundamental Concepts of Infection and Pathogenesis (1 cr), G852 Concepts of Cancer Biology (2), G720 Stem Cell Biology (1), J807 Current Topics in Immunology (2 cr), J829 Current Topics in the Molecular Genetics of Microorganisms (2 cr); J842 Neoplastic Determinants (2 cr)].

Further, students' communication skills and breadth of knowledge will be enhanced by required participation in Research in Progress. The weekly Research in Progress meetings are attended by faculty, postdoctoral fellows, and students and provides an informal forum in which, each week, someone (usually a student) presents ongoing research efforts and the other participants provide input. It is an excellent opportunity to improve one's communication skills and have a healthy intellectual give and take. After each student presentation, the students and a faculty member give constructive feedback to the presenter. Further breadth in the departmental disciplines will be achieved by required attendance at the weekly departmental seminar. Students will be encouraged, but not required, to participate in a journal club within their chosen area: immunology, pathogenesis, or cancer.

**Changes from the current program:** Consistent with our Ph.D. program, we are decreasing the number of credits of didactic coursework. Our total required non-thesis credits will be a minimum of 14, compared to the

previous requirement of 20 credits. Whereas students previously did three rotations, they will now be required to do two rotations. This will allow them to more quickly join a laboratory and begin their thesis research. Rather than taking one Cell Biology Course (G817) and one Molecular Biology course (G865) the latter of which no longer is taught, we have built more flexibility into this proposed curriculum: students may choose two courses from among the areas of biochemistry, molecular biology/genetics, and cell/systems biology. [Please note that we will change our pre-requisite requirements for entrance into the program to recommend but not require biochemistry]. Rather than taking at least 6 credits in the immunology, pathogenesis or cancer, students will take at least 4 credits. Rather than taking 2 credits of J830 Seminar in Microbiology in which students learn communication skills through presentations of their research, they will take G655 Skills - Research Communications Seminar (1 cr) in year one and present their research at Research in Progress (RIP), in year 2. Additionally, students will take one credit of Experimental Design and Biostatistics.

**The rationale of the proposed curriculum.** In the past, it commonly took 2.5 to 3 years to complete the M.S. degree. The revised program has been streamlined to allow completion in 2 to 2.5 years. Further, this new curriculum is consistent with the new Ph.D. program where the number of credits of didactic coursework has been decreased. Finally, a number of required courses in the current M.S. curriculum are no longer available. Some have been replaced by new courses offered in IBMG.

## Microbiology and Immunology M.S. Curriculum

### Students must take at least 5 credits from among the courses shown below

G715 Biomed I – Biomedical Science I – Biochemical Basis of Biological Processes	3 credits
G716 Biomed II – Biomedical Science II – Molecular Biology and Genetics	3
G717 Biomed III – Biomedical Science III – Cellular Basis of Systems Biology <b>or</b>	3
G817 Molecular Basis of Cell Structure and Function	2

### Students must take at least 4 cr from the courses shown below

G729 Introduction to Immunological Systems	1
G728 Fundamental Concepts of Infection and Pathogenesis	1
G852 Concepts of Cancer Biology	2
G720 Stem Cell Biology	1
J807 Current Topics in Immunology	2
J829 Current Topics in Microorganisms	2
J842 Neoplastic Determinants	2

### Plus

J802 Introduction to Research (2-8 week rotations:one fall, one spring)	2
G655 Skills - Research Communications Seminar	1
G855 Skills – Experimental Design and Biostatistics	1
G505 Responsible Conduct of Research	1
J810 Thesis Research	16

In total the students will have at least 14 non-thesis credits and 16 thesis credits.

Students will also attend the weekly departmental seminar series, as well as attend and, in their second year present, at the weekly Departmental Research in Progress (RIP). They will be encouraged to attend a journal club in their area of interest.

### Grades

An overall average of at least a B (3.0) is required. Only 3 credits of C (2.0) can be counted toward the required credits of didactic coursework.